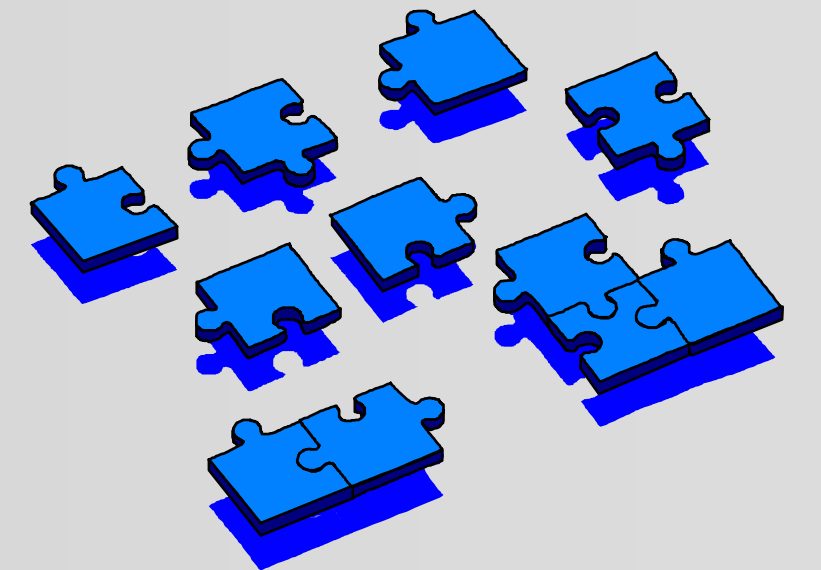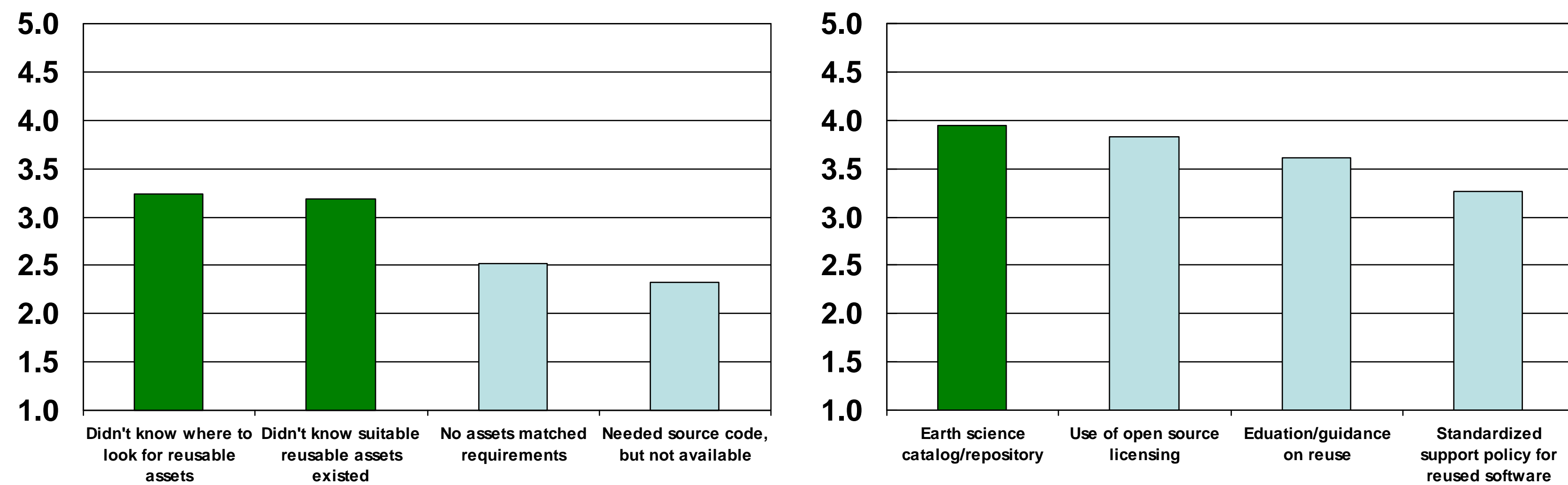# NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
ESDS Reuse Working Group

Earth Science Software Reuse Enablement Systems
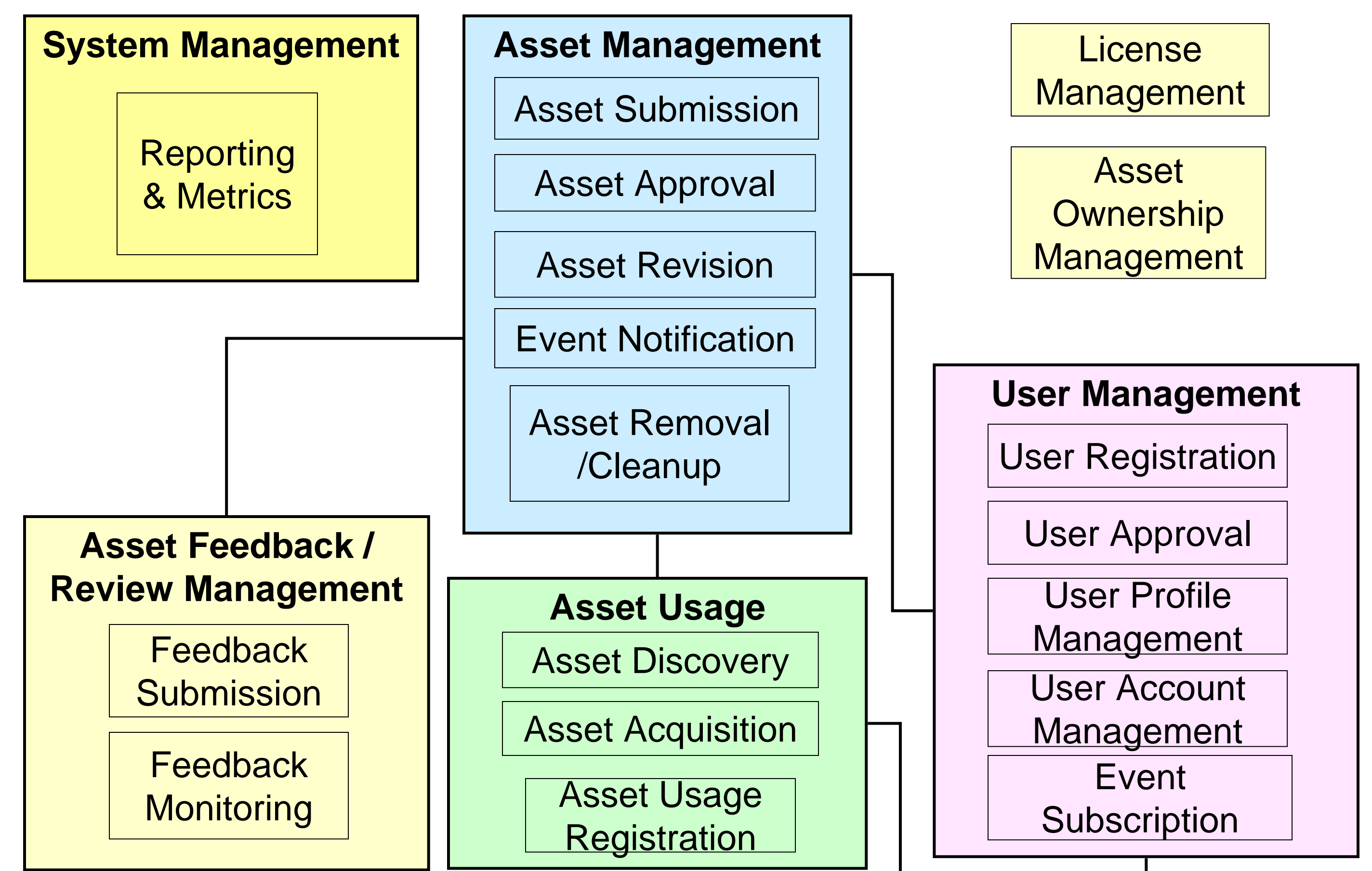
Some Important Survey Results

Factors preventing reuse of existing assets

Importance of factors to increase the level of reuse

Recommendations

• NASA should establish an effective mechanism for dissemination of reusable assets within the Earth science community.

• Based on the conclusions of the technology evaluation, NASA should implement a reuse enablement system.

Screenshots of Some of the Sites Reviewed

GCMD – Provides many data sets in many areas of Earth science

NASA Open Source Sites – Good at promoting NASA-produced open source software

Sourceforge – A general software repository that provides software in many different fields

Reuse Enablement System Requirements

System Management
- Reporting & Metrics

Asset Management
- Asset Submission
- Asset Approval
- Asset Revision
- Event Notification
- Asset Removal /Cleanup

License Management

Asset Ownership Management

Asset Feedback / Review Management
- Feedback Submission
- Feedback Monitoring

Asset Usage
- Asset Discovery
- Asset Acquisition
- Asset Usage Registration

User Management
- User Registration
- User Approval
- User Profile Management
- User Account Management
- Event Subscription

However, none of the existing sites fulfill the role of a software repository for the Earth science community of software developers.

NASA Systems Reviewed

Requirement / Feature	Global Change Master Directory (GCMD)	GSFC Open Source Site	Ames Open Source Site	HDF-EOS Tools and Information Center	Computational Technologies Project	Earth Observing System Clearinghouse (ECHO)	Planetary Data Systems Software Download
Domain	Earth science	Earth and space science	General science	Earth science, HDF/HDF-EOS	Earth and space science	Earth science	Planetary astronomy
Type of Assets	Data sets, data services	Open source packages	Open source packages	Applications	Applications and source code	Metadata	Tools, binaries and source
Register User						★☆☆	
Contribute/Update Assets	★★☆	★☆☆	★☆☆	☆☆☆	☆☆☆	★★☆	☆☆☆
System Feedback	★★☆	★★☆	★★☆	☆☆☆	★★☆	★★☆	★★☆
Automatic Notifications	★★★	★☆☆	★☆☆	☆☆☆	☆☆☆	★☆☆	☆☆☆
Discovering Assets	Hierarchy, Search	List	List	List, Filter	Hierarchy	Search	List
Register Asset Usage	☆☆☆	★★★	★★★	☆☆☆	☆☆☆	☆☆☆	☆☆☆
Provide Asset Review		★☆☆					
Monitoring Feedback	★☆☆	★★☆	★☆☆	☆☆☆	★☆☆	★☆☆	★☆☆
Secure Log In / Registration	N/A	NO	NO	NO	N/A	YES	N/A
Catalog or Repository	Catalog	Both	Both	Repository	Catalog	Catalog	Both
Operation Support	Large	Small	Small	Inactive	Small	Available	Small
Technology	RSYNC, Zope, CVS, Linux, Java, and others	PHP	JavaServer Pages	Cold Fusion	HTML	XML (WSDL), SOAP, UDDI	Cold Fusion

Non-NASA Systems Reviewed

Requirement / Feature	Open Channel Foundation / COSMIC	SourceForge	Freshmeat	Scientific Applications on Linux	National Technology Transfer Center	National HPCC Software Exchange	Netlib	Savannah	Space Telescope Science Institute	Astronomical Software and Documentation Service
Domain	General	General	General	Scientific	Federal technologies (mostly NASA)	HPCC	Mathematics	General	Astronomy	Astronomy
Type of Assets	Applications and source code	Open source applications	Open source applications	Tools and packages with source code	Applications	Tools and end packages	Source codes	Tools and packages	Packages, source	Packages, source
Register User	★★★	★★★	★★☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆	★★☆		
Contribute/Update Assets	★★☆	★★★	★★☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆	★★☆	★★☆	★★☆
System Feedback	★☆☆	★☆☆	★★☆	☆☆☆	★★☆	☆☆☆	☆☆☆	★★☆	★★☆	★★☆
Automatic Notifications	★★☆	★☆☆	★★☆	☆☆☆	★★☆	☆☆☆	☆☆☆	★☆☆	☆☆☆	☆☆☆
Discovering Assets	List, Hierarchy, Search	Hierarchy, Search	Hierarchy, Search	Hierarchy, Search (broken)	List, Hierarchy, Search	Hierarchy, Search	Hierarchy, Search	List, Search	List, Hierarchy	List, Hierarchy, Search
Register Asset Usage	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆	☆☆☆
Provide Asset Review		★☆☆	★★★							
Monitoring Feedback	★★☆	★★☆	★★☆	★☆☆	★☆☆	☆☆☆	☆☆☆	★★☆	★☆☆	★☆☆
Secure Log In / Registration	YES	YES	NO	N/A	N/A	N/A	N/A	YES	N/A	N/A
Catalog or Repository	Repository	Repository	Repository	Catalog	Both?	Catalog	Repository	Repository	Repository	Catalog
Operation Support	Medium	Large	Medium	Inactive	Uncertain	Inactive	Large	Large	Small	Medium
Technology	PHP, MySQL	PHP	XML-RPC	HTML, Java	ASP	Repository In a Box	HTML	Perl, PHP, MySQL	HTML	HTML

Conclusions

• A new catalog/repository system is needed to encourage and better enable software reuse within the community of Earth science software developers.
• Some collaboration with existing systems may be possible, but existing systems alone cannot meet the needs of this community.
• An architecture study must be performed to determine the most expeditious and cost-effective solution for such a system.

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